

## ABSTRACT

A femtosecond laser radiation or a picosecond laser radiation output from light source 6 is split into a first beam reflected to an angle of 90 degrees by a beam splitter 7 and a straightly advancing second beam cut out by the beam splitter 7. The first beam is reflected at an angle of 90 degrees by a second reflecting mirror 9, reflected again at an angle of 90 degrees by a fourth reflecting mirror 11, and is collimated by a second lens 15 to be irradiated onto an optical fiber core wire 13 to be written. The second beam is reflected at an angle of 90 degrees by a first reflection mirror 8, reflected again at an angle of 90 degrees by a second reflection mirror 10, and is collimated by a first lens 14 to be irradiated onto the optical fiber core wire 13 to be written. The femtosecond laser output from the light source 6 is split into two by the beam splitter 7, which interfere with each other in the vicinity of the core of the optical fiber core wire 13 to generate a change in the refractive indices of the glass depending on the light intensity distribution of the interference fringes, such that the gratings are written in the core 1.